UNC HEALTH

UNC MEDICAL CENTER GUIDELINE

Pediatric Floor Enteral Electrolyte Replacement

This guideline provides suggested management of enteral electrolyte replacement therapy in hospitalized pediatric patients admitted to the Pediatric Acute or Intermediate Care Units.

Definitions

- Hypokalemia – potassium <3 mmol/L
  - Mild: 2.6-3 mmol/L or ≥3 mmol/L with symptoms or electrocardiogram (EKG) changes
  - Moderate: <2.5 mmol/L
- Hypocalcemia – serum calcium <7 mg/dL or ionized calcium <4.5 mg/dL
- Hypomagnesemia – magnesium <1.5 mg/dL
  - Mild: 1.2-1.5 mg/dL
  - Moderate: <1.2 mg/dL
- Hypophosphatemia – phosphorus <3 mg/dL

Clinical Pearls:

- Enteral replacement is preferred UNLESS unable to tolerate oral or enteral intake, severe imbalances, unstable hemodynamics, and/or symptomatic
- Consider scheduling ALL enteral electrolyte replacement for 48-72 hours except for potassium repletion (ordered as one time dose)

Table 1: Enteral Electrolyte Replacement Symptoms, Etiology, and Evaluation

Symptoms	Etiology		Evaluation
Hypokalemia			
Weakness/paralysis Ileus Arrythmias (widened QRS interval, ST segment depression, prolonged PR or QT interval, peaked T wave, decreased P wave amplitude) Rhabdomyolysis	Hyperaldosteronism Diabetic ketoacidosis Antibiotics Diuretics Metabolic alkalosis Leukemia Burns Low dietary intake Plasmapheresis	Skin losses Gastrointestinal losses Laxative abuse Anorexia nervosa Malnutrition Drugs (insulin, B_2 agonists) Dialysis	Investigate alkalosis, hemolyzed specimen, medications (diuretics, insulin, aminoglycosides, amphotericin B), urine potassium, dietary history
Hypocalcemia			
Tetany Muscle cramping/weakness Fatigue Seizures Arrhythmia (prolonged QT)	Hypomagnesemia Hyperphosphatemia Hyperparathyroidism Drugs (bisphosphonates)	Vitamin D deficiency Tumor lysis syndrome Pancreatitis Malabsorption	Renal, calcium / magnesium / phosphorous, ionized calcium, albumin, parathyroid hormone, vitamin D
Hypomagnesemia			
Anorexia, nausea, vomiting Weakness Psychological changes Hyperreflexia Tetany Arrythmia (prolonged QT, Torsades de Pointes, ectopy)	Hypercalcemia Hyperaldosteronism Drugs (diuretics, tacrolimus, cyclosporine, amphotericin B)	Gastrointestinal losses Diabetes Pancreatitis	Renal, calcium / magnesium / phosphorous

Developed by: Lily Price, PharmD; Jack Guerci, PharmD, MBA, BCPPS; Abigail Benfield, PharmD, BCPPS; Kathy Riley, PharmD

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Hypophosphatemia			
Irritability Paresthesia Confusion Seizures	Hyperparathyroidism Rickets Vitamin D deficiency Renal losses	Poor intake Malabsorption Drugs (steroids)	Renal, calcium / magnesium / phosphorus, consider vitamin D, parathyroid hormone

Table 2: Enteral Electrolyte Replacement Management Recommendations

Management		
Hypokalemia		
Replace when potassium <3 mmol/L and asymptomatic OR if potassium ≥3 with symptoms or EKG changes		
Dosing recommendations per DOSE:		
Potassium level	**Dose**	
2.6-3 mmol/L	0.5 mEq/kg	
≤2.5 mmol/L	1 mEq/kg	
• Maximum 1-2 mEq/kg/dose or 40 mEq/dose • Consider scheduling up to 4 times daily depending on severity		
Hypocalcemia		
Replace when serum calcium <7 mg/dL (or ionized calcium <4.5) and asymptomatic OR calcium ≥7 (or ionized calcium ≥4.5) with symptoms or EKG changes		
Dosing recommendations per DOSE:		
Calcium level	**Dose**	
<7 mg/dL (or ionized <4.5 mg/dL)	10-25 mg/kg elemental calcium	
• Maximum 25 mg elemental calcium/kg/dose • Consider scheduling up to 3 times daily depending on severity		
Hypomagnesemia		
Replace when magnesium <1.5 mg/dL and asymptomatic OR magnesium ≥1.5 with symptoms or EKG changes		
Dosing recommendations per DOSE:		
Magnesium level	**Dose**	
1.2-1.5 mg/dL	10 mg/kg elemental magnesium	
<1.2 mg/dL	20 mg/kg elemental magnesium	
• Maximum 20 mg elemental magnesium/kg/dose • Consider scheduling up to 4 times per day depending on severity • Note: magnesium chelate has potentially less gastrointestinal side effects compared to magnesium oxide		
Hypophosphatemia		
Replace when phosphorus <3 mg/dL and asymptomatic OR phosphorus ≥3 with symptoms		
Dosing recommendations per DOSE: (recommended range = 0.16-0.64 mmol/kg/dose)		
Weight	**Dose**	***mmol/kg range***
≤6.99 kg	2 mmol	*≥0.29 mmol/kg*
7-12.99 kg	4 mmol	*0.31- 0.57 mmol/kg*
13-29.99 kg	8 mmol	*0.27-0.62 mmol/kg*
≥30 kg	16 mmol	*≤0.53 mmol/kg*
• Maximum 0.64 mmol phosphorus/kg/dose • Consider scheduling up to 4 times per day depending on severity		

Monitoring

- Recheck electrolytes within 48-72 hours following enteral electrolyte repletion to determine if further therapy is warranted

Table 3. UNC Formulary Enteral Electrolyte Options

Product	Type	Content		
Potassium				
Potassium chloride ER tablet	Oral tablet (do not crush)	10 mEq tablet 20 mEq tablet		
Potassium chloride solution	Oral solution	20 mEq/15 mL		
Potassium chloride (Klor-Con) packet	Oral packet	20 mEq (1 packet)		
Calcium				
		Ordered dose	**Elemental Calcium (Ca)**	
Calcium carbonate tablet	Chewable tablet	500 mg (1 tablet)	200 mg Ca	
Calcium carbonate tablet	Oral tablet	1500 mg (1 tablet)	600 mg Ca	
Calcium carbonate (1250 mg (elemental calcium 500 mg)/5 mL)	Oral suspension	250 mg (1 mL)	100 mg Ca	
Magnesium				
		Ordered dose	**Elemental Magnesium (Mg)**	
Magnesium oxide tablet	Oral tablet	400 mg (1 tablet)	241.3 mg Mg	
Magnesium oxide-Mg AA chelate (Magnesium Plus Protein)	Oral tablet	133 mg (1 tablet)	133 mg Mg	
Magnesium carbonate (54 mg/5 mL)	Oral liquid	200 mg (1 mL)	10.8 mg Mg	
Phosphorus				
		Ordered dose of phosphorus	**mEq Potassium (K)**	**mEq Sodium (Na)**
Sodium phosphate (3 mmol/mL) (3 mmol phosphorus, 4 mEq Na per mL)	Oral solution	4 mmol	-	5.3 mEq Na
		6 mmol	-	8 mEq Na
		8 mmol	-	10.6 mEq Na
		16 mmol	-	21.2 mEq Na
Potassium phosphate (3 mmol/mL) (3 mmol phosphorus, 4.4 mEq potassium per mL)	Oral solution	2 mmol	3 mEq K	-
		4 mmol	5.9 mEq K	-
		8 mmol	11.7 mEq K	-
		16 mmol	23.5 mEq K	-
Potassium phosphate tablet (500 mg)	Oral dispersible tablet (in 6-8 oz water)	3.7 mmol	3.7 mEq K	-
Phos-Nak, Neutra-Phos packet	Oral packet	8 mmol (1 packet)	7.1 mEq K	6.9 mEq Na
		16 mmol (2 packet)	14.2 mEq K	13.8 mEq Na

References

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